

Keeping Out Bad Immigrants of Plant World

Federal Horticultural Board Exercises Strict Quarantine Over Insect Pests in Plants, Diseased Potatoes, Trees and Shrubs—Danger in Cotton—Nursery Stock—Flowers—Personnel of the Board.

Special Correspondence WASHINGTON, D. C.

ALTHOUGH it may seem ridiculous to spend thousands of dollars annually to prevent one little moth egg that could pass through the eye of a canyonic needle from entering the country, the machinery of the Departments of Agriculture, State, Treasury and Post Office are co-operating to keep out that little pest, the pink cotton boll-worm.

The "general stain" which conducts the defense against plant disease is known as the federal horticultural board and is composed of five high officials of appropriate bureaus of the Department of Agriculture.

All along the fertile valley of the Nile, where the luxuriant Egyptian cotton grows, planters are more worried over the ruinous work of the pink boll-worm in their cotton fields than they are over the greater devastation of the European war.

In the consternation caused by the loss of a fifth of their crop they have thrown up the barriers and are excluding all foreign cottons—an unnecessary measure against the pest, with its life cycle of destruction so firmly in possession of their cottons that they are leaving their baleful impress.

The pink boll-worm was taken to Egypt from India, where its wretched family billions are still leaving their baleful impress.

The tiny egg is deposited by the mother moth upon the young plant leaf, which becomes the food of the larva, emerging in ten days from the egg. Thence it eats its way into the heart of the cotton boll, where in this destructive stage it spends about twenty days, until full grown, when it is nearly half an inch long.

It has been feeding upon the cotton seeds, and when about to transform into the pupa and become a moth again it occupies the hull, from which it has devoured the kernel. The worm's pinkish color and its place of living have given it the name "pink boll-worm."

In about two weeks more the moth emerges, a fragile insect about three-quarters of an inch in expanse, now a grayish brown color with darker spots. In three or four days it deposits its eggs and lives ten days or more, doing harm all its life and leaving behind it a multiplied evil succession.

While the annual yield of American Sea Island cotton, the best in the world, is by no means enough to make all the spool cotton, automobile tires and other textiles requiring a grade better than that of ordinary upland cotton, it is somewhat surprising to learn that 60,000 bales of Egyptian cotton containing the pink boll-worm are imported with impunity to the United States.

This was made possible by a system of fumigation originated by the board and worked out on a commercial scale by its experts, by which every bale is disinfected and the cotton is packed in a great horizontal cylinder, hermetically sealed and then the air is pumped out until there is almost a vacuum within. Hydrocyanic acid gas is then admitted and the bales are compressed before shipment until they are almost as hard as blocks.

Naturally, our Canadian neighbor wishes to share in the high prices, and his crop is wanted here; but the board says: "No diseased stock may be entered."

Accordingly, this working plan has been agreed upon between the two countries: Canada may send potatoes free from injurious disease and insect pests to ports of entry designated by the board. On arrival the tubers are examined by federal inspectors, and if found to be infected are returned to the consignors at their expense.

Potatoes are coming into the country in such quantities that, although in the main they are all right, carloads are sent back almost every day.

A disease known as potato wart or canker having broken out in Great Britain, Germany and Austro-Hungary, the department issued its proclamation forbidding absolutely the importation of potatoes from those countries.

Another thing which the board is fighting is the importation of any nursery stock which carries the white pine blister rust, a tree disease destructive of both ornamental and forest pines.

This blight may be carried by all five-leaved pines from Europe, Asia, Canada and Newfoundland and all gooseberries and currants from Canada. Their importation is absolutely prohibited.

Cotton seed, except from some parts of Mexico; the seed of alligator pear from Mexico and Central America, living canes of sugar, all citrus nursery stock (oranges, lemons, etc.), all Indian corn or maize from oriental countries and some less important plant products may not be imported at all because each is likely to carry some disease which thus far has not broken out in our native plants. This rule is just as reasonable as it is to prevent the landing of passengers from some port known to be full of infectious disease as the bubonic plague.

These plant quarantines cover the stock found in certain localities or certain diseased plants, but the oversight of the board is extended to regulate the entry of all woody and certain other plants and seeds imported.

Nearly all European and some other foreign countries maintain a rigid inspection service of their nursery stock, and importations from those places are allowed on permits issued to the importer by the department of agriculture. This involves certificates by the foreign inspection service that the plants are free from disease and insect pests, whereupon they are admitted through the customhouse and may be sent to any state in the Union.

The plants, however, are not free for delivery for nearly every state maintains an inspection service which calls for the examination of all imported seeds and plants. The results of the inspection are reported by the state examiners to the board, together with the action, which in case of serious pest or disease is the destruction of the plants.

Inspection is generally very thorough, and may be enforced by the board, if not kept up to the standard, by establishing a quarantine against the products of that state.

No importations of seeds or plants are permitted from countries which do not maintain an inspection service, except in very small quantities for experimental purposes, and then the board will grant a special permit unless after satisfactory federal inspection, they may be entered.

Formerly many seeds and plants, samples of cotton and the like, were sent in through the mails—a very convenient way for all concerned. The board, however, has, with regret, abolished it, because it is impossible to inspect the packages in the mail; and no matter how careful the senders were, the contents were liable to carry infections. If the senders were careless, the danger was very great. Egyptian cotton seeds sent through the mails were found to be contaminated as high as 20 per cent with the pink boll-worm.

Even for a total abstinence, a physician may order an exception for the patient's good, and there is one exception to this rule. Seeds and plants may be sent to the Department of Agriculture for in that case they are examined by experts, and if disinfected at once on arrival at the grounds. The board maintains on the grounds



MINIATURE VACUUM DISINFECTING TANK IN THE EXPERIMENTAL LABORATORY; COMMERCIAL TANKS ARE BUILT AFTER THIS MODEL.

INSPECTING SUSPECTED PLANTS FOR PESTS OR SIGNS OF DISEASE.

There are only four of these fumigating tanks in the country, one at each of the four ports of entry for cotton—New York, Newark, N. J.; Boston and San Francisco. They are under private ownership and are run as a business proposition, a charge being made for each bale of cotton sterilized. The plant at Newark was built for its owner's accommodation by one of the great manufacturers located there, as he uses vast quantities of the Egyptian product in making spool cotton.

Although privately operated, these tanks are under the closest of government inspection. The bales must be left in the receiving chambers a certain time; the poisonous gas must be of a positive strength; the appliances and chemicals tested and every precaution must be taken to evacuate the gas without risk of life to the men operating the plant.

One shipment of the infested cotton seed—and it is believed to be the only one—is known to have entered this country, and that was before the quarantine was established. This lot was taken to Arizona, where a state quarantine was in force; the infestation was detected and the whole lot burned. It is believed that the pink pest has not succeeded in running the blockade.

Since July, 1913, the board has quarantined all cotton seed from foreign countries, and has intercepted several lots, all found to be infested with the pink boll-worm.

One of the most pressing matters now under the board's attention is the oversight of potatoes coming into the country to make up the 60,000,000-bushel shortage in the American crop.

THE FEDERAL HORTICULTURAL BOARD. LEFT TO RIGHT—CHARLES L. MARLATT, CHAIRMAN; WALTER D. HUNTER, GEORGE B. SUDWORTH, WILLIAM A. ORTON, REUBEN C. ALTHOUSE, SECRETARY. KARL F. KELLERMAN, ALSO A MEMBER, NOT PRESENT WHEN PHOTOGRAPH WAS TAKEN.

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United States Must Preserve Nitrates or Be at an Enemy's Mercy

Nitrates Necessary in Making of Smokeless Powder and High Explosives—In Case of War United States Might Be Denied Shipments From Chile—The Remedy a Plant to Fix the Nitrogen of the Atmosphere—Congressional Appropriation of Twenty Millions for a Fixation Plant—A Talk With a National Authority on Production of Nitrates.

Special Correspondence WASHINGTON, D. C.

SHOULD war come to the United States, and the powder and explosives now on hand—and they will not last long against a powerful enemy—are exhausted, the army, if there be any, would have to fall back upon the black powder of the civil war.

The country would be utterly at the mercy of the invader, because there would be no nitrates with which to make smokeless powder and high explosives. The first care of an enemy strong enough to make a landing would be to stop the shipping of nitrates (saltpeter) from Chile.

The military experts and the scientific bodies organized for preparedness have seen this danger, and the last Congress, in alarm, appropriated \$20,000,000 to erect, if the President so decides, a plant to fix the nitrogen of the atmosphere, that from the very element which sustains life may be taken the substance which is death's instrument in Europe.

More power for a fixation plant which will turn out in the form of ammonia enough nitrate for use in war is required than that furnished by the consolidated waters of the great lakes tumbling over Niagara. The cost of operating such a plant is enormous; nevertheless it must be met, unless some better way of securing the indispensable nitrates can be found.

At the instance of the War Department, Director Van H. Manning of the bureau of mines has considered it well worth while to dispatch the bureau's

they are doing it, for he knows that they get most of their nitrates by means of by-products, which save thousands of tons of nitrates otherwise wasted in making many millions of tons of coke from soft coal.

The Germans, however, cut off from foreign nitrates, have augmented their supply by erecting a fixation plant said to turn out ammonia at the rate of 140,000 tons a year.

It is generally supposed that Germany, before the war, obtained most of the ammonia used for explosives from Chile, and that nearly all the nitrates which came as a by-product from coal were used to make fertilizer. Owing to the relatively small farming area of that country, high cultivation is necessary to make the ground yield crops that will feed the population while the blockade continues.

But all the nitrates had to be used to manufacture cannon food, and there was none left for the crops of 1915; that is why they fell off. The fixation plant filled the deficit; that is why the crops of 1916 have been plentiful.

To obtain an accurate statement of the nitrate situation recourse has been had to one of the experts of the Department of Agriculture, Dr. J. W. Turrentine, one of the national authorities on the production of nitrates, although he is more interested in seeing it used for agriculture than for war.

His training and his study of methods and apparatus have made a chemical engineer, rather than a laboratory chemist, out of him. He has studied all known sources of nitrates, and has told how to obtain from domestic sources an ample supply for all purposes; namely, by the oxidation of ammonia produced as a by-product in the process of coking bituminous coal.

"If one starts a fire of soft coal in an open grate," said he, "at first colored gases are given out; the coal turns a dull black and settles into a mass. That mass is coke—soft coal without the gases and volatile matter."

The gases, which here are the important thing, contain ammonia, benzol, toluol, coal tar and other valuable things, which may be recovered as by-products from the coking process.

Coking soft coal frees it from these gases, gives it many of the desirable qualities of anthracite and is a prerequisite for its use in the blast furnace in the production of iron ore. The mistake must not be made, however, of supposing that coke is only valuable for making iron and steel, for as a matter of fact the potential energy of soft coal

is increased by approximately 20 per cent by utilizing the gas and the coke separately.

"In this country during the past year about 75,000,000 tons of soft coal were converted into 45,000,000 tons of coke at a loss of the greater part of the difference between these quantities."

"One of the crassest processes of national waste has been that of letting the gases in coke-making go up in smoke from the old-fashioned beehive oven; for thereby during the past twenty years by-products of the value of hundreds of millions of dollars have been wasted."

The primitive method of making coke was to dump into an oven, from its shape called a beehive, a charge of three tons or so of coal and burn it with restricted air until the gases were

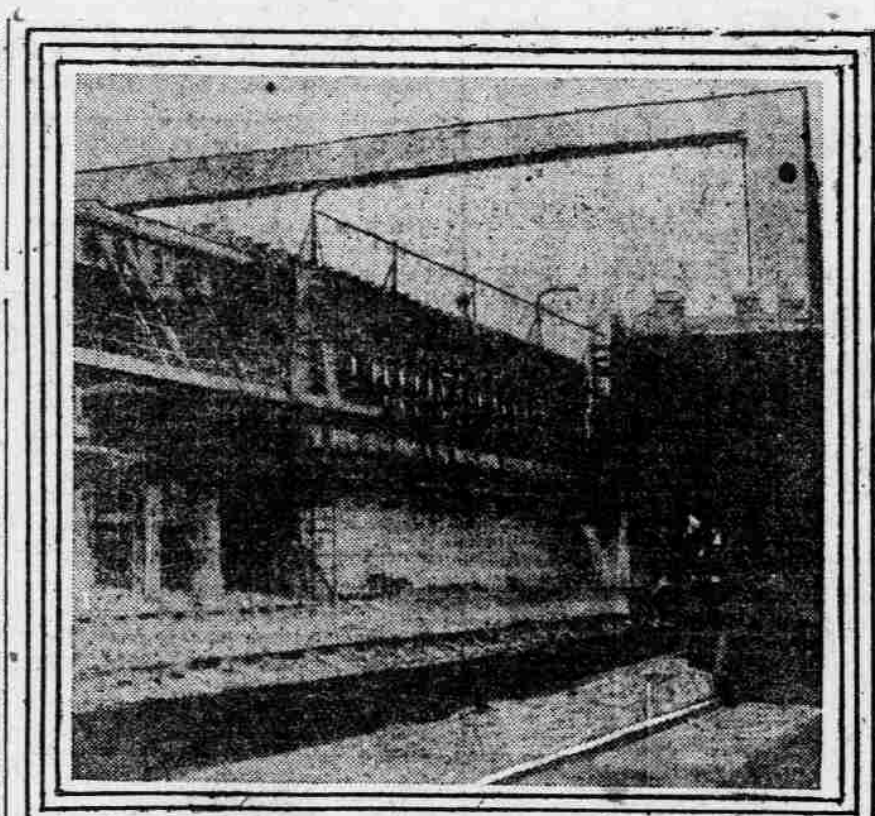
driven out of the oven top and wholly lost. The first step taken toward creating a market, 'good business' will insist upon the coking of as much of this coal as may be required, for the coke has nearly all the fuel capacity which the coal had and is freed from the gas which makes its use undesirable in many places on account of dirt and smoke under combustion and gases which make it unsuitable for household and other uses."

"In war emergency the government could take over this entire production; it would prohibit the use of raw soft coal, or take other measures to compel the coking of all soft coal before final consumption. In taking this course it

represents but a small portion of the soft coal used annually; and if there is such a demand for ammonia as to create a market, 'good business' will insist upon the coking of as much of this coal as may be required, for the coke has nearly all the fuel capacity which the coal had and is freed from the gas which makes its use undesirable in many places on account of dirt and smoke under combustion and gases which make it unsuitable for household and other uses."

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A NEST OF BY-PRODUCT COKING OVENS. BY THEIR USE THE GAS FROM THE COAL MAY BE CONVERTED INTO NITRATES.

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would be procuring quantities of benzol and toluol. In so doing it would be enforcing a scheme for economy in the use of the great but not inexhaustible natural product—coal.

"At present the country has about 7,800,000 fruit trees (6,800,000 from France), 4,650,000 fruit tree stocks, nearly 2,000,000 rosebushes, 1,400,000 ornamental trees, 842,000 coniferous trees, besides many other plant trees.

One diseased lot means an injury to an entire community, one pest, like the pink boll-worm, may destroy a staple crop, and the thin line of defense against these possible invaders is that created by the federal horticultural board."

"If there should not, particularly at the outset, be enough nitrates for munitions and for fertilizer too, it must be borne in mind that little fertilizer is used by the American farmer in raising the staple articles—wheat, corn, rye, oats, hay and cotton."

"The gas that may be made from coking coal in the by-product oven is a large and cheap source of power when used with gas engines. It can be generated wherever wanted and applied to industrial use. In emergency this power can be converted into electrical power for the fixation of nitrogen from the atmosphere as the Germans, in their peculiar situation, have found necessary, or for running munition factories."

"I have not attempted in this informal talk to detail the various processes or to discuss elaborately the costs and quantities of coal, coke, ammonium, steel, rate of ammunition consumption, or the many other things which are involved in supplying the needs of war."

"But I have said the subject sufficiently to show that the coal-coking by-products are a source of power and of materials which may be needed in time of peace for agricultural purposes, and that if war should befall and foreign supplies become available, they could be made to supply munition factories to any desired extent, even through a war protracted many years."